

release of the drill string. Once the parameter reaches an acceptable level, the regulation of the release of the drill string returns to the primary control parameter.

To prevent the selected secondary control parameters from continually overriding the primary control parameter, an operator adjusts the level at which the secondary parameters will override the primary control to a point where only undesirable conditions not registered by the primary control will trigger their intervention. That variability in adjustment permits the primary control to regulate the release of the drill string without interference from the secondary controls unless an undesirable condition not registerable by the primary control parameter occurs.

Applicant, therefore, respectfully submits the specification which contains the above-explanation of the automatic drilling system clearly describes to one skilled in the art how the parameters may be utilized in tandem to control the release of a drill string even though they are somewhat interrelated. Accordingly, Applicant respectfully requests the withdrawal of the 35 USC §112, first paragraph, objection to the specification.

Furthermore, Applicant respectfully traverses the 35 USC §112, first paragraph, rejection of claims 1-11 because the specification clearly describes that the secondary controls will only override the primary control when an undesirable drilling condition not registerable by the primary control parameter occurs. Applicant, therefore, also respectfully requests the withdrawal of the 35 USC §112, first paragraph, rejection of claims 1-11.

Claims 1-11 stand rejected under 35 USC §103 by Ball in view of Rogers and the Gatlin publication. Applicant respectfully traverses the above-rejection because, absent Applicant's disclosure, the proposed combination clearly fails to suggest to one of ordinary skill in the art Applicant's solution to a particular problem.

Applicant designed his automatic drilling system to overcome problems encountered during drilling operations, especially directional drilling operations, when only weight on bit is utilized to control the release of a drill string. For example, in directional drilling operations, the drill string often lays against the borehole, resulting in the weight sensor measuring a weight on bit different from the actual weight on bit. Consequently, the drill string controller incorrectly releases the drill string, causing inefficient drilling operations and possible damage to the drilling equipment. In response to that deficiency in weight on bit drilling systems, Applicant designed an automatic drilling system capable of drilling under the control of different parameters to prevent an incorrect reading from one parameter from impeding drilling operations or damaging drilling equipment.

With respect to Ball, that reference merely discloses a weight on bit well drilling control system. Ball does not disclose, teach, or suggest that any other parameter (i.e., drilling fluid pressure, drill string torque, or drill string RPM) may be used to ~~control the release of a drill string~~. Thus, the Examiner employs the Rogers reference and the Gatlin publication to modify the Ball drilling system in an attempt to construct Applicant's automatic drilling system. However, Rogers discloses only that drill thrust and drill speed are interdependent in an apparatus that maximizes the rate of penetration of a drill utilized in a coal mine to drill bolt holes in the coal mine's ceiling. Similarly, the Gatlin publication discloses only that various drilling parameters such as drilling fluid density, drilling fluid pressure, and RPM affect the penetration rate of a drill bit.

Applicant, therefore, respectfully submits that both Rogers and Gatlin fail to provide any disclosure that fairly suggests to one of ordinary skill in the art that the problems encountered in weight on bit drill control systems may be solved by constructing an automatic drilling system utilizing other drilling parameters. The Rogers reference does not address and is not even remotely concerned with the difficulties experienced in controlling the

release of a drill string during the drilling of a borehole. Gatlin only teaches the downhole consequences that various variables have on the rate of penetration and does not even address the issue of controlling the release of a drill string. Thus, both Rogers and Gatlin fail to recognize that such a problem in the control of the release of drill strings even exists. Accordingly, Applicant respectfully submits that, without a recognition that a problem exists, the mere interrelatedness of various drilling parameters and the fact those parameters affect the rate of drill bit penetration do not teach their incorporation into a drill string control system.

In light of the above-described deficiencies in the teachings of Rogers and Gatlin, Applicant respectfully submits that the combination of Ball with Rogers and Gatlin constitutes an impermissible use of hindsight. Merely because various parameters are related and those parameters affect the rate of drill bit penetration does not make their use in a control system obvious without a teaching suggesting such a use. Both Rogers and Gatlin do not address the difficulties involved in controlling a drill string, and, certainly, neither reference discloses that the use of different parameters or a combination of different parameters will solve the problems encountered in weight on bit drill string control systems. Applicant, therefore, respectfully submits the only suggestion that parameters other than weight on bit may be employed to control the release of a drill string exists in Applicant's disclosure. Accordingly, Applicant respectfully submits that the combination of Ball with Rogers and Gatlin is an impermissible hindsight reconstruction of Applicant's claimed invention using Applicant's disclosure because the mere interrelatedness of parameters does not teach Applicant's specific solution to a specific problem. Thus, Applicant respectfully submits claims 1-11 are allowable.

Claims 15-18 have been added to claim the design of the regulators. Because none of the cited references discloses the claimed regulators, Applicant respectfully submits those claims are

allowable.

Applicant has reviewed the prior art made of record but not applied against the claims and deems those references not to anticipate or in any combination render obvious the claimed invention.

In view of the foregoing, Applicant respectfully requests reconsideration of the rejected claims and consideration of the new claims. Applicant further earnestly solicits early allowance of the Application.

Respectfully submitted,

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CERTIFICATE OF EXPRESS MAIL

I, Ana I. Robinson, do hereby certify that the foregoing documents are being deposited with the United States Postal Service as Express Mail, postage prepaid, in an envelope addressed to the Commissioner of Patents and Trademarks, Washington, D.C. 20231, on this date of 6/10/94.

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